INCH-POUND
MIL-PRF-1/160N
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SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, POWER
TYPE 7034

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

DESCRIPTION: Tetrode.

See figure 1.

Mounting position: Any.

Weight: 4 ounces nominal.

ABSOLUTE RATINGS: F_1 = 150 MHz; F_2 = 500 MHz

Parameter	Ef	Eb	Ec1	Ec2	Ehk	Ib	Pg1	Pg2	Pp
Unit:	V ac note 2	V dc	V dc	V dc	V dc	mA dc	W	W	W
Maximum:									
C Tlg (Up to 150 MHz):	- - -	2,000	-250	300	± 150	250	2	12	250
C Tlg (150 to 500 MHz):	- - -	1,250	-250	300	± 150	250	2	12	250
Test conditions:	6.0	2,000	Adj	300	0	150	- - -	- - -	- - -

ABSOLUTE RATINGS: F1 = 150 MHz; F2 = 500 MHz.

Parameter:	T (base seal)	T (anode seal)	T (anode core)	tk
Unit:	°C note 1	°C note 1	°C note 1	sec (min)
Maximum:				
C Tlg (Up to 150 MHz):	175	200	250	30
C Tlg (150 to 500 MHz):	175	200	250	30
Test conditions:	note 3	- - -	- - -	120

GENERAL:

Qualification - Required.

Tube type 7035 has been deleted from this tube specification sheet: use MIL-PRF-1/1331, type 7609.

TABLE I. Testing and inspection.

Inspection	Method	Notes	Conditions	Acceptance level (see note 12)	Symbol	Limits Min	Limits Max	Unit
Conformance inspection, part 1								
Pulsing emission	1231	7	eb = ec1 = ec2 = 850 v	0.65	is	30	- - -	a
Electrode current (screen)	1256	-	Eb = 1,000 V dc	0.65	Ic2	-5	+3	mA dc
Electrode voltage (grid)	1261	-	Eb = 1,000 V dc	0.65	Ec1	-32	-45	V dc
Total grid current	1266	8	Ib = 125 mA dc	0.65	Ic1	- - -	-15	µA dc
Current division (method A, long pulse)	1372	-	Eb = Ec2 = 250 V dc; Ec1 = -100 V dc; egk/ib = 1.0 a; prr = 11.0 ± 1.0; tp = 4,500 µs (min)	0.65	egk ic1 ic2	8 - - - - - -	18 250 260	v ma ma
Primary grid emission (control)	1266	-	Ic1 = 70 mA dc; t = 15; anode and screen grid floating	0.65	Isg1	- - -	-25	µA dc
Primary grid emission (screen)	1266	-	Ec1 = 0; Ic2 = 100 mA dc; t = 15; anode floating	0.65	Isg2	- - -	-250	µA dc
Heater current	1301	-		0.65	If	2.30	2.90	Aac
Conformance inspection, part 2								
Low-frequency vibration	1031	-	No voltages applied	- - -	- - -	- - -	- - -	- - -
Shock, specified pulse	1042	-	No voltages applied; accel = 15 G peak (min); D = 11 ± 2 ms half-sine wave	- - -	- - -	- - -	- - -	- - -
Shock, and low-frequency vibration end points:	- - -	-						
Electrode voltage (grid)	1261	-		- - -	Ec1	-32	-45	V dc
Total grid current	1266	-		- - -	Ic1	- - -	-15	µA dc

See footnotes at end of table I.

TABLE I. Testing and Inspection. - Continued.

Inspection	Method	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
Conformance inspection, part 2 -Continued							
RF useful power output (1)	2214	-	F = 150 MHz (min); Ec1 = -90 V dc; Ic1 = 25mA dc (max); Eg1/Ib = 250 mA dc	Po	225	- - -	W (useful)
RF useful power output (2)	2214	9	Class C amplifier; Ef = 5.5 V ac; F = 460 to 490 MHz; Eb = 1,250 V dc; Ec1 = -90 V dc; Ec2 = 250 to 300 V dc; Ic1 = 20 mA dc (max); Eg1/Ib = 250 mA dc	Po	145	- - -	W (useful)
Direct-interelectrode capacitance	1331	-	EIA standard shield No. 320 and No. 321, or equal	Cgp Cin Cout	- - - 14.5 4.0	0.05 17.0 4.8	pF pF pF
Heater-cathode leakage	1336	-	Ehk = + 150 V dc Ehk = - 150 V dc	Ihk Ihk	- - - - - -	150 150	µA dc µA dc
Conformance inspection, part 3							
Life test (1)	- - -	-	Group C; rf useful power output (1): t = 500 hours	- - -	- - -	- - -	- - -
Life-test (1) end points:	- - -						
Pulsing emission	1231	-		is	21	- - -	a
Primary grid emission (control)	1266	-		Isg1	- - -	-100	µA dc
Primary grid emission (screen)	1266	-		Isg2	- - -	-250	µA dc
Heater-cathode leakage	1336	-	Ehk = +150 V dc Ehk = - 150 Vdc	Ihk Ihk	- - - - - -	150 150	µA dc µA dc

See notes at end of Table I.

TABLE I. Testing and Inspection. - Continued.

Inspection	Method	Notes	Conditions	Symbol	Limits Min	Limits Max	Unit
Conformance inspection, part 3 - Continued.							
Life test (2)	- - -	-	Group C; Ec1 = Ec2 = Eb = 0; t = 500 hours; Ef = 6.6 V ac	- - -	- - -	- - -	- - -
Life-test (2) end points:	- - -						
Interelement leakage resistance, cold	1366	10	Rs = 2.5 Megohm E = 100 V dc; g1 negative	Rg1k	10	- - -	Megohm
			E = 500 V dc; g2 positive	Rg1g2	10	- - -	Megohm
Periodic-check tests			E = 500 V dc; g2 positive	Rg2k	10	- - -	Megohm
Life test (3)	- - -	-	RF useful power output (2); t = 500 hours	- - -	- - -	- - -	- - -
Life-test (3) end points:							
Pulsing emission	- - -						
Primary grid emission (control)	1231	-		is	21	- - -	a
Primary grid emission (screen)	1266	-		Isg1	- - -	-100	µA dc
Heater-cathode leakage	1266	-		Isg2	- - -	-250	µA dc
	1336	-	Ehk = +150 V dc	Ihk	- - -	150	µA dc
Coolant pressure drop versus coolant flow (forced air)	1155	4	Ehk = - 150 V dc No voltages applied	Ihk - - -	- - - - - -	150 0.60	µA dc Inches of water
Forced cooling							
	1143	5	Eb = 1.000 V dc Ec1/Ib = 250 mA dc	T(anode core)	- - -	175	°C
				T(anode seal)	- - -	150	°C
Overload				T(base seal)	- - -	125	°C
Overload end point:	- - -	6	Eb = 1,000 V dc	- - -	- - -	- - -	- - -
Total grid current	1266	-		Ic1	- - -	-25	µA dc

NOTES:

1. When the tube is operated at 100 percent of maximum rated anode dissipation at an incoming air temperature of 25°C maximum, a minimum airflow of 5.6 cubic feet per minute (cfm) at sea level shall pass through the anode cooler. The static pressure drop across the anode cooler at this flow is approximately 0.26 inch of water. If the socket on Drawing 246-JAN (see note 13) is used, an incoming airflow of 5.6 cfm to the grid end of the socket is required. At this flow of 5.6 cfm, the static pressure drop directly across the tube and socket is approximately 0.60 inch of water. This pressure drop varies with the amount of escaping air and with the shape and construction of the air director. The airflow rating applies at bias voltages less than 100 volts and frequencies less than 500 MHz. Air cooling of the tube shall be increased with increased negative grid bias, increased incoming air temperatures, or increased frequency of operation, or a combination. In all cases of operation, a socket which provides forced-air cooling of the base shall be used and maximum seal and radiator temperature ratings shall not be exceeded. The airflow shall be applied before or simultaneously with electrode voltages, and may be removed simultaneously with them.

TABLE I. Testing and Inspection. - Continued.

NOTES: - Continued.

2. Maximum life may be obtained by adjusting the heater voltage in accordance with the application. A table of heater voltage verse frequency is presented as a guide.

Frequency (MHz)	Ef (V ac)
Up to 300	6.00
301 to 400	5.75
401 to 500	5.50

3. In all cases of electrical tests involving application of heater voltage, the socket on Drawing 246-JAN (see note 13) shall be used. An incoming airflow of 6.0 cfm maximum to the grid end of the socket is permitted.

4. An infinite baffle system as shown on figure 2, or equal, with an airflow of 5.6 cfm at sea level shall be used. The static pressure drop is measured across the tube and socket.

5. The forced-cooling test shall be made as follows:

   At an ambient temperature of 25 °C, both the base and the anode shall be cooled by applying an airflow of 5.6 cfm maximum, at sea level from a single source using the infinite baffle system as shown on figure 2, or equal.

   At the specified test conditions, the anode core temperature, the anode seal temperature, and the base seal temperature shall not exceed the specified limits.

   All temperatures shall be measured by means of thermocouples located as follows:

   Anode core: This thermocouple shall be embedded in the top of the cooler, with the anode dome removed, if necessary, by means of drilling a small hole, shallow enough so that the tube vacuum shall not be lost, placing the welded thermocouple junction therein, and then bending the edges of the hole in order to hold the thermocouple firmly in place.

   Anode seal: This thermocouple shall be attached, using any appropriate material, to the surface of the metal immediately above metal-to-dielectric seal.

   Base seal: This thermocouple shall be attached, using any appropriate material, to the surface of the metal immediately adjacent to the base dielectric material and at the immediate periphery of the dielectric material.

   In all cases, good electrical continuity between the thermocouple and the metal area in close proximity must be demonstrated before the cooling test can be performed.

6. This is a destructive test. Operate the tube in an upright position. Preheat the tube at specified test conditions for 1 minute. Remove airflow for 100 seconds. Restore airflow and after 1 minute perform the total grid current test. Any tube which evidences a short or open circuit during this test will be considered a failure.

7. The maximum value of the voltage applied to the anode and grids shall not exceed 900 volts. The pulse duration measured at 5 percent of the maximum value shall be not less than 3 microseconds (µs). At 50 percent amplitude, the duration shall be less than 2 µs. The applied voltage shall have a maximum repetition rate such that the duty cycle, based on the pulse length measured at 50 percent amplitude, shall not exceed 0.0002 (0.02 percent). An alternate pulsing emission test may be used with the following conditions and limits:

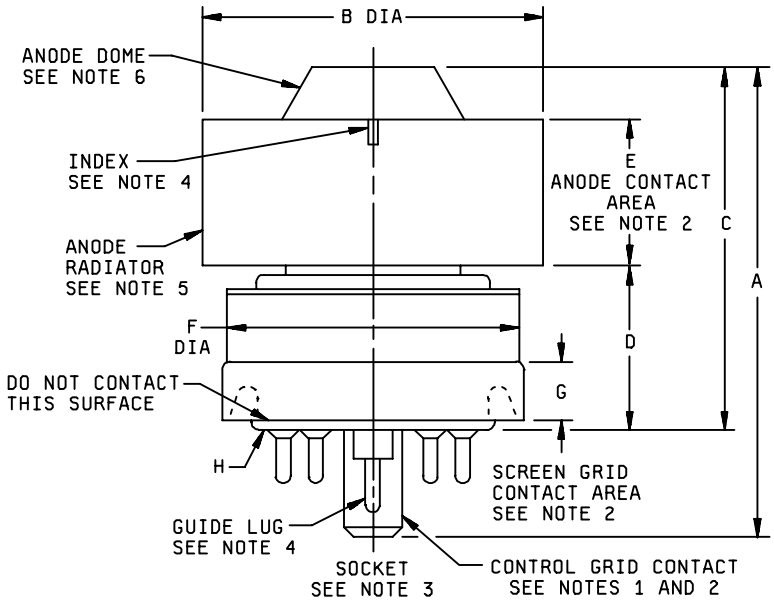
Conditions	Parameter	Minimum	Maximum
is = 30 a , eb = ec1 = ec2	etd	- - -	850 v

For life-test end points, is = 21 a.

TABLE I. Testing and Inspection. -Continued.

NOTES: - Continued.

8. This test is to be the first test performed at the conclusion of the holding period.
9. Circuit and cavity shall be in accordance with Drawing 223-JAN (see note 13).
10. This test shall be made a minimum of 30 minutes after Ef is turned off. Rated airflow shall be maintained during the 30-minute interval. Measurement to be made with General Radio Megometer Model No. 1862C, or equivalent. Unused elements shall be left floating.
11. Tube type 7035 has been deleted from this tube specification sheet : use MIL-PRF-1/1331, type 7609.
12. This specification sheet uses accept on zero defect sampling plan, in accordance with MIL-PRF-1, table III.
13. Contact preparing activity if assistance is needed to find JAN drawings.



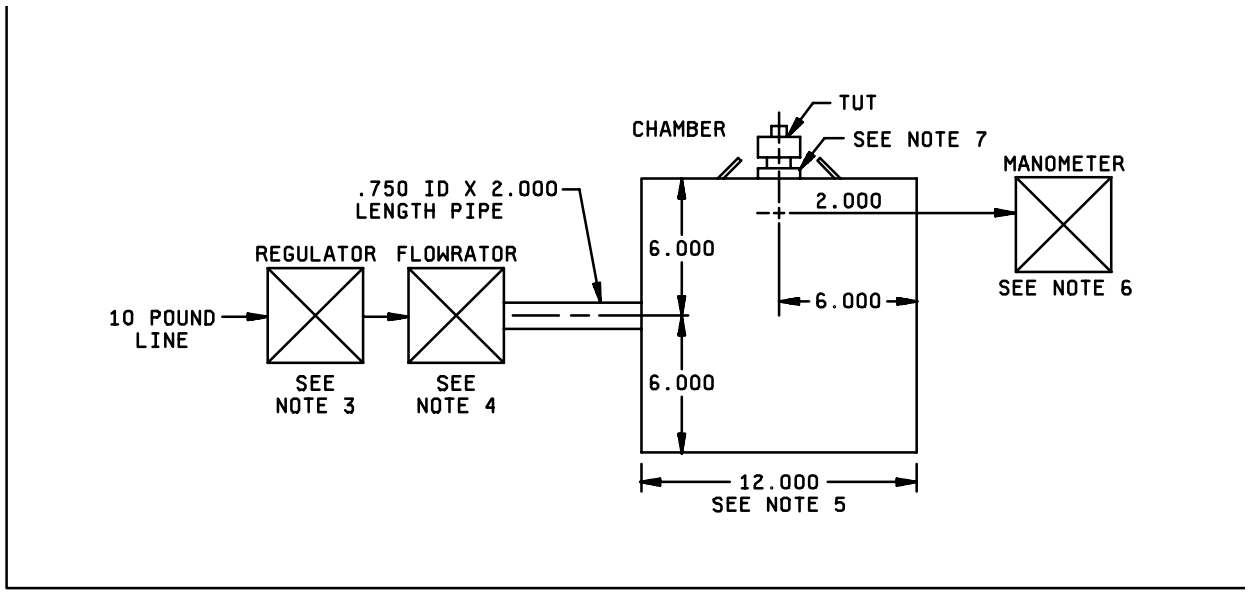
Pin connections	
Pin no.	Element
1	g2
2	k
3	h
4	k
5	int con
6	k
7	h
8	k
center post	g1
radiator	a
base ring	g2

Dimensions in inches with metric equivalents (mm) in parentheses		
Ltr	Minimum	Maximum
Conformance inspection, part 2		
A	2.224 (56.49)	2.414 (61.32)
C	1.710 (43.43)	1.860 (41.24)
Conformance inspection, part 3 (periodic check) (See note 7)		
B	1.610 (40.89)	1.640 (41.66)
D	0.750 (19.05)	0.810 (20.57)
E	0.710 (18.03)	0.790 (20.07)
F	- - -	1.406 (35.71)
G	0.187 (4.75)	- - -
H	Base: B8-236 (EIA) (See note 1)	

NOTES:

1. Pin alignment shall be checked by means of JEDEC gage GB8-3. Dimensions of control-grid contact shall be inspected by means of gages specified on Drawing 246-JAN (see note 13) and shall be conformance inspection, part 2.
2. Alignment of anode, screen-grid, and control-grid contact surfaces shall be determined by means of gage specified on Drawing 168-JAN (see note 13). Conformance inspection, part 2, shall apply.
3. Air system socket shall be as specified on Drawing 246-JAN (see note 13).
4. Location of guide lug of control-grid contact may be referenced by a notch or arrow on the anode radiator in the position shown.
5. Anode clamping shall be confined to the anode radiator.
6. Dome contour shall be such that it will be contained within crosshatched area of template shown on figure 3. Optical comparator techniques are normally used for this purpose.
7. Perform on a sample of 10 tubes from the first production lot of each year, with one failure allowed. In case of a sample failure, the failing dimension(s) shall become part of conformance inspection, part 2 for three consecutive successful submissions at which time the test may revert to the yearly periodic basis.

FIGURE 1. Outline drawing of electron tube type 1034.

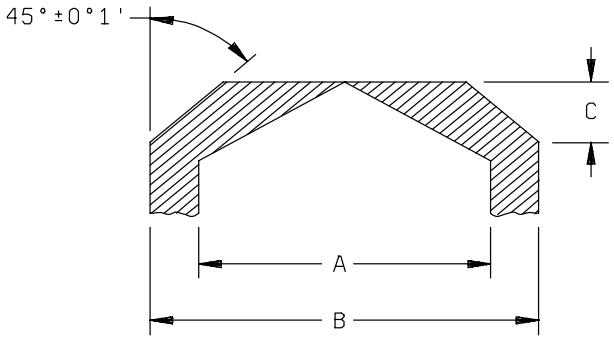


Dimensions	
Inches	Millimeters
0.750	19.05
2.000	50.80
6.000	152.40
12.000	304.80

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are in parentheses.
3. Fisher-Governer pressure regulator model 67, or equal.
4. Fisher Porter flowrator model B4-27-10/77, or equal.
5. 12 inches (304.80 mm) cube inside dimensions, compound sealed, or equal.
6. F. W. Dwyer manometer, 0 to 1 inch (25.40 mm) of water (Fisher Scientific Company 11-295-5 draft gage), or equal.
7. Socket specified on drawing 246-JAN (contact preparing activity if help is needed to find JAN drawings).

FIGURE 2. Block diagram.



Dimensions in inches with metric equivalents (mm) in parentheses		
Ltr	Maximum	Minimum
A	0.7005 (17.79)	0.6995 (17.77)
B	1.0005 (25.41)	0.9995 (25.39)
C	0.1905 (4.84)	0.1895 (4.82)

FIGURE 3. Contour limits of dome shape.

Custodians:
Army - CR
Navy - EC
Air Force - 99
DLA - CC

Review activities:
Army - AR
Navy - AS, CG, MC, OS, SH
Air Force - 11

Preparing activity:
DLA - CC

(Project 5960-3670)